

WHAT IS CLAIMED IS:

1. A seat back frame for a vehicle seat comprising:
 - first and second side members spaced apart from each other;
 - each of said first and second side members being made of ultra-high tensile strength steel;
 - said first side member having a first longitudinal body of a substantially U-shape in cross-section;
 - said first longitudinal body comprising a pair of first spaced apart flange sections and a first main plate section interconnecting said first spaced apart flange sections;
 - said first side member having a first upper region, a first lower region, and a middle region between said first upper region and said first lower region;
 - said second side member having a second longitudinal body of a substantially U-shape in cross-section;
 - said second longitudinal body comprising a pair of second spaced apart flange sections and a second main plate section interconnecting said second spaced apart flange sections;
 - said second side member having a second upper region, a second lower region, and a second middle region between said second upper region and said second lower region;
 - an upper member arranged between said first and second upper regions of said first and second side members;
 - said upper member being made of ultra-high tensile strength steel;
 - said upper member having first and second end portions;
 - said upper member being mounted, by spot-welding, to said first and second upper regions of said first and second side members with said first and second end portions thereof being fitted in said first and second side members;
 - and

a lower member arranged between said first and second lower regions of said first and second side members;

said lower member being made of ultra-high tensile strength steel;

said lower member having third and fourth end portions; and

said lower member being mounted, by spot-welding, to said first and second lower regions of said first and second side members with said third and fourth end portions thereof being fitted in said first and second side members.

2. A seat back frame according to Claim 1 wherein said first side member is provided at an upper area of said first main plate section thereof with a first reinforcing rib portion, said first reinforcing rib portion being formed by embossing a region of said upper area of said first main plate section and making the region of said upper area of said first main plate section concave in such a manner that the region of said upper area of said first main plate protrudes inward, wherein said second side member is provided at an upper area of said second main plate section thereof with a second reinforcing rib portion, said second reinforcing rib portion being formed by embossing a region of said upper area of said second main plate section and making the region of said upper area of said second main plate section concave in such a manner that the region of said upper area of said second main plate protrudes inward, and wherein said upper member is provided at said first and second end portions thereof with first and second tongue-like pieces, said first and second tongue-like pieces being spot-welded to inward protruding surfaces of said first and second reinforcing rib portions.

3. A seat back frame according to Claim 2 wherein said inward protruding surfaces of said first and second reinforcing rib portions are made flat.

4. A seat back frame according to Claim 2 wherein said first side member is provided at a middle area of said first main plate section thereof with a third reinforcing rib portion and provided at a lower area of said first

main plate section thereof with a fourth reinforcing rib portion, and wherein said second side member is provided at a middle area of said second main plate section thereof with a fifth reinforcing rib portion and provided at a lower area of said second main plate section thereof with a sixth reinforcing rib portion.

5. A seat back frame according to Claim 3 wherein said first side member is provided at a middle area of said first main plate section thereof with a third reinforcing rib portion and provided at a lower area of said first main plate section thereof with a fourth reinforcing rib portion, and wherein said second side member is provided at a middle area of said second main plate section thereof with a fifth reinforcing rib portion and provided at a lower area of said second main plate section thereof with a sixth reinforcing rib portion.

6. A seat back frame according to Claim 2 wherein one of said first spaced apart flange portions of said first side member is provided with seventh reinforcing ribs, and wherein one of said second spaced apart flange portions of said second side member is provided with eighth reinforcing ribs.

7. A seat back frame according to Claim 3 wherein one of said first spaced apart flange portions of said first side member is provided with seventh reinforcing ribs, and wherein one of said second spaced apart flange portions of said second side member is provided with eighth reinforcing ribs.

8. A seat back frame according to Claim 1 wherein said upper member comprises an upper section and a base section, said upper section and said base section being combined with each other.

9. A seat back frame according to Claim 8 wherein said first side member is provided at an upper area of said first main plate section thereof with a first reinforcing rib portion, said first reinforcing rib portion being formed by embossing a region of said upper area of said first main plate section and making the region of said upper area of said first main plate

section concave in such a manner that the region of said upper area of said first main plate protrudes inward, wherein said second side member is provided at an upper area of said second main plate section thereof with a second reinforcing rib portion, said second reinforcing rib portion being formed by embossing a region of said upper area of said second main plate section and making the region of said upper area of said second main plate section concave in such a manner that the region of said upper area of said second main plate protrudes inward, wherein said upper section of said upper member has fifth and sixth end portions, and first and second tongue-like pieces provided at said fifth and sixth end portions of said upper section, said first and second tongue-like pieces being spot-welded to inward protruding surfaces of said first and second reinforcing rib portions, and wherein said base section of said upper member has seventh and eighth end portions, and third and fourth tongue-like pieces provided at said seventh and eighth end portions of said base section, said third and fourth tongue-like pieces being spot-welded to said inward protruding surfaces of said first and second reinforcing rib portions

10. A seat back frame according to Claim 9 wherein said inward protruding surfaces of said first and second reinforcing rib portions are made flat.

11. A seat back frame according to Claim 9, wherein each of said first and second reinforcing rib portions is formed into a substantially rectangular shape.

12. A seat back frame according to Claim 1 wherein said lower member comprises a longitudinal body having ninth and tenth end portions, and first and second bracket portions provided at said ninth and tenth end portions, said first and second bracket portions of said lower member being spot-welded to said first and second lower regions of said first and second side members.

13. A seat back frame according to Claim 2 wherein said lower member comprises a longitudinal body having ninth and tenth end portions, and first and second bracket portions provided at said ninth and tenth end portions, said first and second bracket portions of said lower member being spot-welded to said first and second lower regions of said first and second side members.

14. A seat back frame according to Claim 3 wherein said lower member comprises a longitudinal body having ninth and tenth end portions, and first and second bracket portions provided at said ninth and tenth end portions, said first and second bracket portions of said lower member being spot-welded to said first and second lower regions of said first and second side members.

15. A seat back frame according to Claim 4 wherein said lower member comprises a longitudinal body having ninth and tenth end portions, and first and second bracket portions provided at said ninth and tenth end portions, said first and second bracket portions of said lower member being spot-welded to said first and second lower regions of said first and second side members.

16. A seat back frame according to Claim 5 wherein said lower member comprises a longitudinal body having ninth and tenth end portions, and first and second bracket portions provided at said ninth and tenth end portions, said first and second bracket portions of said lower member being spot-welded to said first and second lower regions of said first and second side members.

17. A seat back frame according to Claim 6 wherein said lower member comprises a longitudinal body having ninth and tenth end portions, and first and second bracket portions provided at said ninth and tenth end portions, said first and second bracket portions of said lower member being spot-welded to said first and second lower regions of said first and second side

members.

18. A seat back frame according to Claim 7 wherein said lower member comprises a longitudinal body having ninth and tenth end portions, and first and second bracket portions provided at said ninth and tenth end portions, said first and second bracket portions of said lower member being spot-welded to said first and second lower regions of said first and second side members.

19. A seat back frame according to Claim 8 wherein said lower member comprises a longitudinal body having ninth and tenth end portions, and first and second bracket portions provided at said ninth and tenth end portions, said first and second bracket portions of said lower member being spot-welded to said first and second lower regions of said first and second side members.

20. A seat back frame according to Claim 9 wherein said lower member comprises a longitudinal body having ninth and tenth end portions, and first and second bracket portions provided at said ninth and tenth end portions, said first and second bracket portions of said lower member being spot-welded to said first and second lower regions of said first and second side members.

21. A seat back frame according to Claim 10 wherein said lower member comprises a longitudinal body having ninth and tenth end portions, and first and second bracket portions provided at said ninth and tenth end portions, said first and second bracket portions of said lower member being spot-welded to said first and second lower regions of said first and second side members.

22. A seat back frame according to Claim 11 wherein said lower member comprises a longitudinal body having ninth and tenth end portions, and first and second bracket portions provided at said ninth and tenth end portions, said first and second bracket portions of said lower member being

spot-welded to said first and second lower regions of said first and second side members.

23. A seat back frame according to Claim 12, further including a supplementary member having the shape of a substantially Ohm-symbol in cross-section, said supplementary member being spot-welded to said longitudinal body and bracket portions of said lower member, whereby said lower member is reinforced.

24. A seat back frame according to Claim 13, further including a supplementary member having the shape of a substantially Ohm-symbol in cross-section, said supplementary member being spot-welded to said longitudinal body and bracket portions of said lower member, whereby said lower member is reinforced.

25. A seat back frame according to Claim 14, further including a supplementary member having the shape of a substantially Ohm-symbol in cross-section, said supplementary member being spot-welded to said longitudinal body and bracket portions of said lower member, whereby said lower member is reinforced.

26. A seat back frame according to Claim 15, further including a supplementary member having the shape of a substantially Ohm-symbol in cross-section, said supplementary member being spot-welded to said longitudinal body and bracket portions of said lower member, whereby said lower member is reinforced.

27. A seat back frame according to Claim 16, further including a supplementary member having the shape of a substantially Ohm-symbol in cross-section, said supplementary member being spot-welded to said longitudinal body and bracket portions of said lower member, whereby said lower member is reinforced.

28. A seat back frame according to Claim 17, further including a supplementary member having the shape of a substantially Ohm-symbol in

cross-section, said supplementary member being spot-welded to said longitudinal body and bracket portions of said lower member, whereby said lower member is reinforced.

29. A seat back frame according to Claim 18, further including a supplementary member having the shape of a substantially Ohm-symbol in cross-section, said supplementary member being spot-welded to said longitudinal body and bracket portions of said lower member, whereby said lower member is reinforced.

30. A seat back frame according to Claim 19, further including a supplementary member having the shape of a substantially Ohm-symbol in cross-section, said supplementary member being spot-welded to said longitudinal body and bracket portions of said lower member, whereby said lower member is reinforced.

31. A seat back frame according to Claim 20, further including a supplementary member having the shape of a substantially Ohm-symbol in cross-section, said supplementary member being spot-welded to said longitudinal body and bracket portions of said lower member, whereby said lower member is reinforced.

32. A seat back frame according to Claim 21, further including a supplementary member having the shape of a substantially Ohm-symbol in cross-section, said supplementary member being spot-welded to said longitudinal body and bracket portions of said lower member, whereby said lower member is reinforced.

33. A seat back frame according to Claim 22, further including a supplementary member having the shape of a substantially Ohm-symbol in cross-section, said supplementary member being spot-welded to said longitudinal body and bracket portions of said lower member, whereby said lower member is reinforced.

34. A seat back frame according to Claim 12, further including a

supplementary member for reinforcing said lower member, said supplementary member comprising a substantially longitudinal body, said substantially longitudinal body of said supplementary member having eleventh and twelfth end portions, and third and fourth substantially L-shaped bracket portions provided at said eleventh and twelfth end portions, said supplementary member being spot-welded to said longitudinal body of said lower member, and said third and fourth bracket portions being spot-welded to said first and second bracket portions of said lower member.

35. A seat back frame according to Claim 13, further including a supplementary member for reinforcing said lower member, said supplementary member comprising a substantially longitudinal body, said substantially longitudinal body of said supplementary member having eleventh and twelfth end portions, and third and fourth substantially L-shaped bracket portions provided at said eleventh and twelfth end portions, said supplementary member being spot-welded to said longitudinal body of said lower member, and said third and fourth bracket portions being spot-welded to said first and second bracket portions of said lower member.

36. A seat back frame according to Claim 14, further including a supplementary member for reinforcing said lower member, said supplementary member comprising a substantially longitudinal body, said substantially longitudinal body of said supplementary member having eleventh and twelfth end portions, and third and fourth substantially L-shaped bracket portions provided at said eleventh and twelfth end portions, said supplementary member being spot-welded to said longitudinal body of said lower member, and said third and fourth bracket portions being spot-welded to said first and second bracket portions of said lower member.

37. A seat back frame according to Claim 15, further including a supplementary member for reinforcing said lower member, said supplementary member comprising a substantially longitudinal body, said

substantially longitudinal body of said supplementary member having eleventh and twelfth end portions, and third and fourth substantially L-shaped bracket portions provided at said eleventh and twelfth end portions, said supplementary member being spot-welded to said longitudinal body of said lower member, and said third and fourth bracket portions being spot-welded to said first and second bracket portions of said lower member.

38. A seat back frame according to Claim 16, further including a supplementary member for reinforcing said lower member, said supplementary member comprising a substantially longitudinal body, said substantially longitudinal body of said supplementary member having eleventh and twelfth end portions, and third and fourth substantially L-shaped bracket portions provided at said eleventh and twelfth end portions, said supplementary member being spot-welded to said longitudinal body of said lower member, and said third and fourth bracket portions being spot-welded to said first and second bracket portions of said lower member.

39. A seat back frame according to Claim 17, further including a supplementary member for reinforcing said lower member, said supplementary member comprising a substantially longitudinal body, said substantially longitudinal body of said supplementary member having eleventh and twelfth end portions, and third and fourth substantially L-shaped bracket portions provided at said eleventh and twelfth end portions, said supplementary member being spot-welded to said longitudinal body of said lower member, and said third and fourth bracket portions being spot-welded to said first and second bracket portions of said lower member.

40. A seat back frame according to Claim 18, further including a supplementary member for reinforcing said lower member, said supplementary member comprising a substantially longitudinal body, said substantially longitudinal body of said supplementary member having eleventh and twelfth end portions, and third and fourth substantially L-

shaped bracket portions provided at said eleventh and twelfth end portions, said supplementary member being spot-welded to said longitudinal body of said lower member, and said third and fourth bracket portions being spot-welded to said first and second bracket portions of said lower member.

41. A seat back frame according to Claim 19, further including a supplementary member for reinforcing said lower member, said supplementary member comprising a substantially longitudinal body, said substantially longitudinal body of said supplementary member having eleventh and twelfth end portions, and third and fourth substantially L-shaped bracket portions provided at said eleventh and twelfth end portions, said supplementary member being spot-welded to said longitudinal body of said lower member, and said third and fourth bracket portions being spot-welded to said first and second bracket portions of said lower member.

42. A seat back frame according to Claim 20, further including a supplementary member for reinforcing said lower member, said supplementary member comprising a substantially longitudinal body, said substantially longitudinal body of said supplementary member having eleventh and twelfth end portions, and third and fourth substantially L-shaped bracket portions provided at said eleventh and twelfth end portions, said supplementary member being spot-welded to said longitudinal body of said lower member, and said third and fourth bracket portions being spot-welded to said first and second bracket portions of said lower member.

43. A seat back frame according to Claim 21, further including a supplementary member for reinforcing said lower member, said supplementary member comprising a substantially longitudinal body, said substantially longitudinal body of said supplementary member having eleventh and twelfth end portions, and third and fourth substantially L-shaped bracket portions provided at said eleventh and twelfth end portions, said supplementary member being spot-welded to said longitudinal body of

said lower member, and said third and forth bracket portions being spot-welded to said first and second bracket portions of said lower member.

44. A seat back frame according to Claim 22, further including a supplementary member for reinforcing said lower member, said supplementary member comprising a substantially longitudinal body, said substantially longitudinal body of said supplementary member having eleventh and twelfth end portions, and third and fourth substantially L-shaped bracket portions provided at said eleventh and twelfth end portions, said supplementary member being spot-welded to said longitudinal body of said lower member, and said third and forth bracket portions being spot-welded to said first and second bracket portions of said lower member.